

Climate Research for Development (CR4D) End of Grant Workshop

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Mainstreaming Climate Services for Resilient Agricultural Systems and Sustainable Development in Ghana

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Key message from the IPCC 1.5 °C Special Report of Global Warming

Humanity will need to make unprecedented changes to avoid extreme heat, floods and poverty.

This is particularly important in the context of sub-Saharan Africa where adaptive capacity is quite low.



Climate change – poses a big challenge for agriculture in Ghana

- Temperature is projected to increase by 2.0 °C and 3.9 °C by 2050 and 2080, respectively,
- In the same period, rainfall will decrease by 10.9% and 18.6% (GEPA, 2010).
 - *threatens food security and presents significant challenges for the attainment of the SDGs & commitments under the Paris Agreement*
- Improved access to timely climate information
 - *offers prospects for smallholder farmers to maintain productivity and build resilient agricultural systems [Jones et al., 2015].*
- Empirical evidence on how to mainstream climate information services is lacking.



Aim and objectives

❖ **Aim:** Assess how climate information can be mainstreamed to strengthen the resilience of agricultural systems to support sustainable development in Ghana.

❖ **Specific objectives**

Determine the extent to which climate information services have been incorporated into existing national policies of Anglophone West African states.

Evaluate the accessibility and opportunities for using climate information in building resilient agricultural systems.

Assess the barriers to the uptake of climate information for building resilience in agricultural systems in Ghana.

Improve the capacity of agricultural development officers in communicating climate information for planning resilient agricultural systems in Ghana.



Research methods and analysis

The research adopted mixed-method approach

- ❖ Policy analysis of national policy documents & sectoral plans
 - ❖ *National Climate Change Policy,*
 - ❖ *Nationally Determined Contributions,*
 - ❖ *Food and Agricultural Policy,*
 - ❖ *National Communications to the UNFCCC,*
 - ❖ *National Climate Change Adaptation Strategy,*
 - ❖ *National Environmental Policy,*
 - ❖ *Regional policy documents – ECOWAS Agricultural Policy and the African Union’s Agenda 2063 were also analysed.*
- ❖ Thematic content analysis (*identify emerging themes*)



Regional & district levels stakeholder workshops

❖ Three (3) interactive workshops to:

i) understand the governance processes and structures at the regional and district levels for mainstreaming climate information.

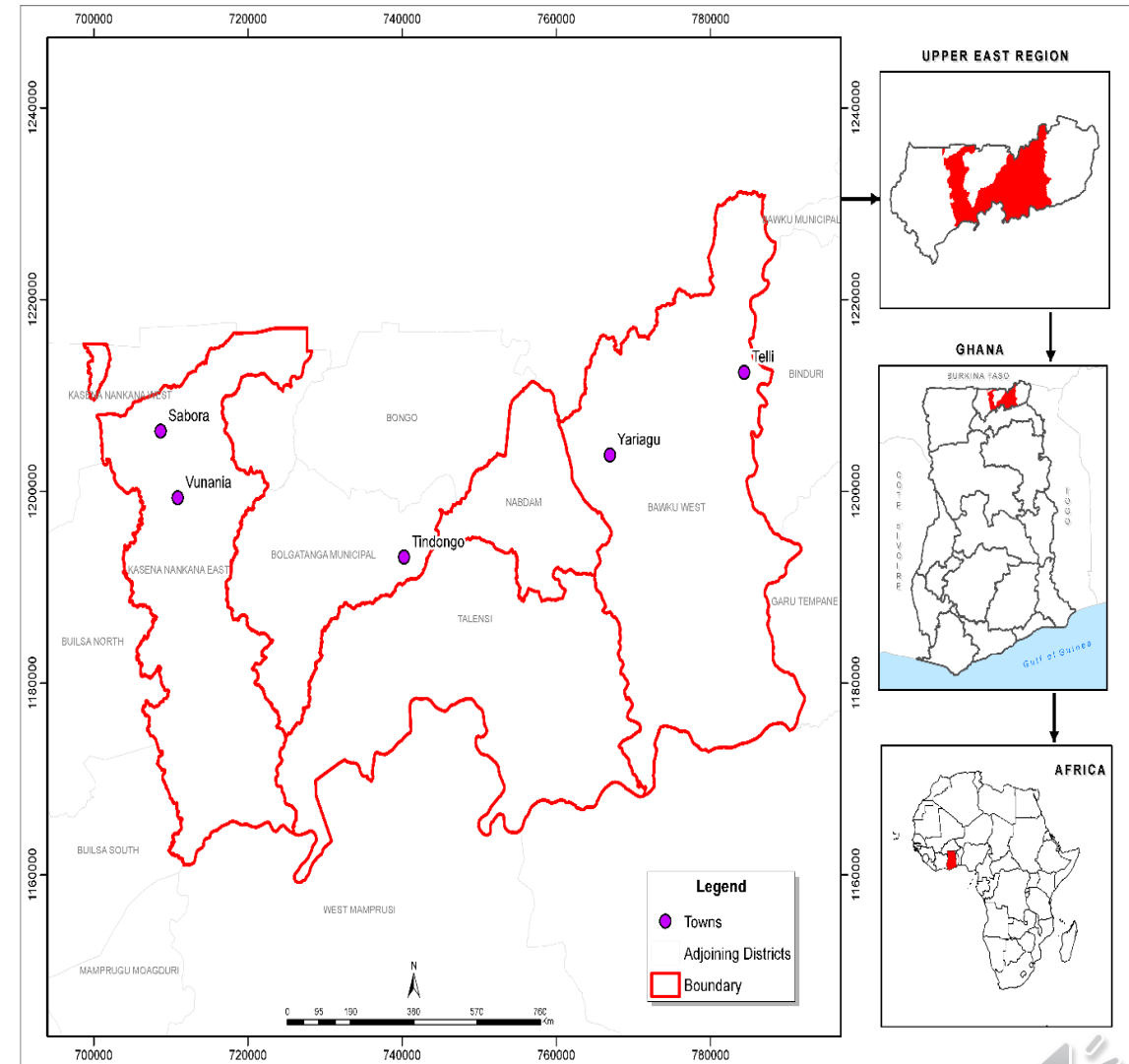
ii) identify the challenges for mainstreaming climate information into district and regional plans and programmes.



Participatory methods

❖ Questionnaire surveys with 555 households selected randomly in 6 communities across 3 districts in the Upper East Region, Ghana (Sept. and Oct. 2019).

- *identifying the types of climate information available to different socio-economic groups*
- *opportunities for using climate information.*
- *communication pathways to end-users*



Focus Group Discussions and Expert Interviews

- ❖ 12 focus group discussions were held
 - ❖ Discussions were in separate male and female focus groups

Expert interviews

- ❖ District level planning officers,
- ❖ District and regional agricultural development officers,
- ❖ Agricultural extension officers/agents,
- ❖ NGOs and CSOs.



Data Analysis

Qualitative data from focus group discussions and key expert interviews

thematic content analysis to draw patterns and identify emerging themes

For quantitative data

Descriptive analysis where possible.

- To investigate the predictors that influence access to and willingness to pay.

logit regression technique in STATA was applied (Deressa et al., 2009).





Overview of Key Findings



	Ghana				Nigeria				Sierra Leone				The Gambia				Liberia			
Key terms	FASDEP II	NCCP	1st UNFCCC	NDC	NCCAS	NAP	1st UNFCCC	NDC	NAPA	NSADP	1st UNFCCC	NDC	NAPA	NNP	1st UNFCCC	NCCP	NDC	NCPS	1st UNFCCC	NDC
Climate	1	689	459	27	983	1	378	122	217	15	323	51	268	3	420	560	146	625	600	35
Climate change	1	545	381	10	826	0	279	87	157	10	239	35	149	0	271	376	92	430	391	23
Climate information	0	2	0	0	0	0	3	0	0	0	0	0	4	0	0	4	1	3	11	1
Climate service(s)	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	1	0
Climate information	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Climate change info	0	0	0	0	2	0	0	0	0	0	1	0	0	0	1	0	1	4	5	0
Climate change risk	0	2	0	1	13	0	0	2	0	0	0	0	0	0	0	6	0	2	0	0
Climate change variability	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Climate variability	0	3	0	0	6	0	3	2	11	0	8	0	0	0	4	2	11	9	0	0
Climate change scenario (s)	0	3	35	0	3	0	7	0	2	0	14	0	0	0	87	1	0	0	10	0
Total	2	1245	875	38	1833	1	672	217	387	25	585	86	421	3	783	947	243	1076	1027	59

Table 1: Reviews of national climate facing documents and policies of Anglophone West African states



Key terms in climate services	African Agenda 2063	Regional Agricultural Policy for West Africa	Land Policy in Africa: West Africa Regional Assessment	ECOWAS Policy for Disaster Risk Reduction
Climate	13	1	6	7
Climate change	8	1	5	3
Climate information	0	0	0	0
Climate service	0	0	0	0
Climate information services	0	0	0	0
Climate change service(s)	0	0	0	0
Climate change adaptation	0	0	0	1
Climate change mitigation	1	0	0	0
Climate change variables(bility)	0	0	0	0
Climate variables(bility)	0	0	0	1
Climate resilient(ce)	2	0	0	0
Meteorological services	0	0	0	0
Weather	0	0	1	1
Weather information	0	0	0	1
Forecast(ing)	0	0	0	1
Total	24	2	12	15

Table 2: Textual analysis of regional climate facing policies for West African sub-region



Objective 2 – Evaluate the accessibility and opportunities for using climate information in building resilient agricultural systems

Results show that only 60% of the respondents received climate information in the 6 study communities

Receipt of climate information	All Sample	Females	Males
Yes	60.4 (335)	59.5 (132)	61.0 (203)
No	39.6 (220)	40.5 (90)	39.0 (130)

Table 3: Receipt of climate information reported by smallholder farmers (%)



Channel for receiving information	All Sample (N = 335)	Female (N = 132)	Males (N = 203)
Radio	74.6	68.9	78.3
Mobile Text Messaging	36.4	48.5	28.6
Phone Voice Messaging	1.5	0.0	2.5
Newspaper	4.5	3.0	5.4
Workshop	28.1	33.3	24.6
Television	2.4	0.8	3.4
Extension Officers	8.7	7.6	9.4
Community Groups	5.7	6.1	5.4
Social Media	2.1	2.3	3.0

Table 4: Medium for receiving climate information



Opportunities for using climate information in dryland farming systems

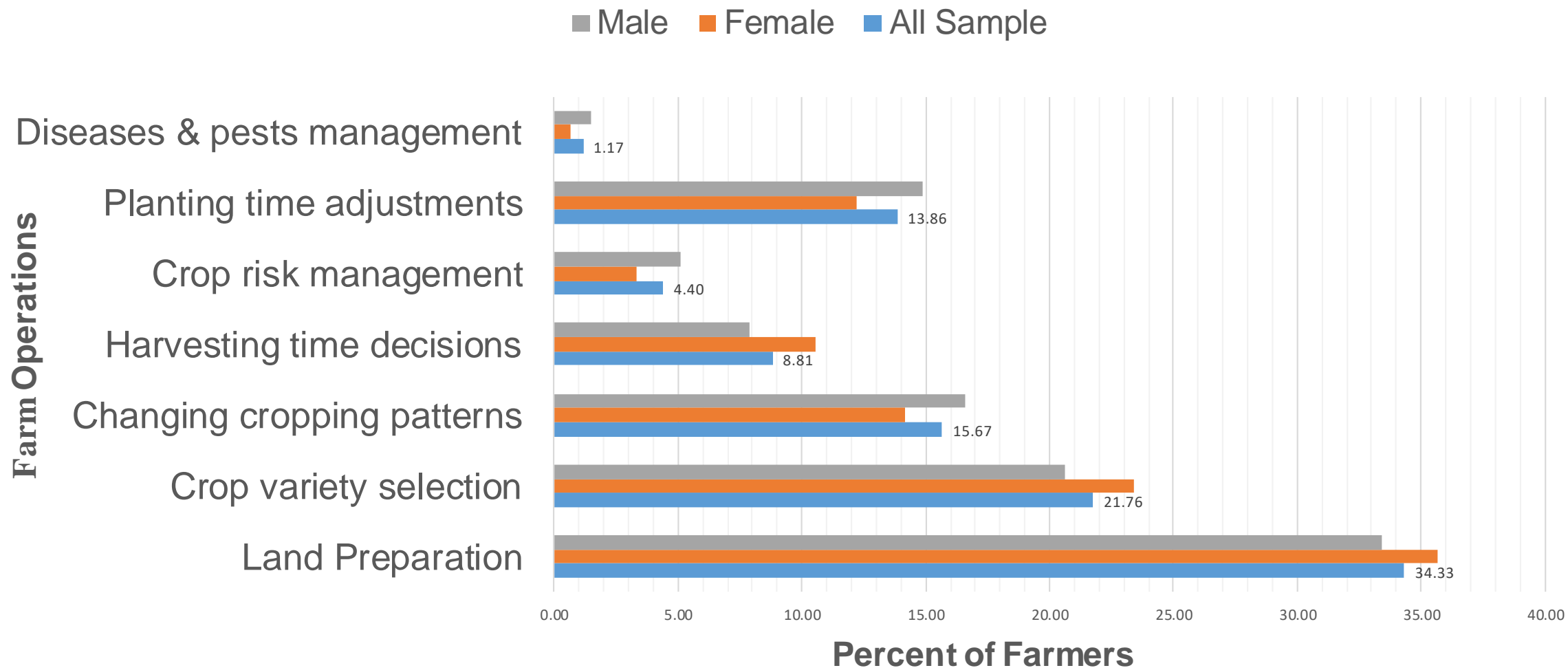


Figure 1: % of respondents for using climate information for specific farming operations



	All Sample		Female		Male	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Age	-0.030*	0.100	-0.016	0.527	-0.028	0.253
Sex	0.875**	0.029				
Farming experience	0.479**	0.015	0.172	0.658	0.576**	0.026
Drought	0.997*	0.076	0.563	0.586	1.979**	0.035
Training	0.928**	0.039	2.554***	0.004	-0.169	0.951
Months HH struggle for food	-0.252**	0.035	-0.345	0.201	-0.275*	0.084
Credit facilities	0.574	0.257	0.570	0.442	1.534**	0.034
Radio	-0.568	0.269	-0.547	0.404	-0.322	0.726
Internet	-0.814	0.163	-1.181	0.246	-0.599	0.434
Mobile phone	-0.128	0.699	0.496	0.836	0.011	0.963
Member of a social group	-0.791***	0.004	-2.303**	0.048	-0.477***	0.000
Educational level	0.347*	0.096	0.144	0.616	0.661***	0.005
Native of study community	-0.654*	0.062	-0.417	0.107	-1.281*	0.092
P-value > Chi Square	0.000		0.002		0.000	



	All Sample		Female		Male		Difference	
	dy/dx	P-value	dy/dx (M _f)	P-value	dy/dx (M _m)	P-value	M _f – M _m	P-value
Age	-0.004	0.800	-0.004	0.846	-0.004	0.280	0.000	0.957
Sex	0.181***	0.005						
Marital status	0.045	0.530	0.067	0.260	-0.018	0.771	0.085***	0.000
Born in the community	-0.112	0.110	-0.175	0.761	-0.142	0.843	-0.033	0.531
Drought	0.037	0.152	0.065	0.259	0.027	0.230	0.038	0.200
Training	0.160	0.543	0.278***	0.001	0.097	0.183	0.181***	0.000
Struggle for food	-0.206***	0.001	-0.321***	0.003	-0.157*	0.071	-0.164***	0.008
Credit facilities	0.207***	0.008	0.230***	0.007	0.154**	0.022	0.076	0.209
Regular remittance	0.149***	0.001	0.127	0.892	0.174**	0.049	-0.047	0.384
Ready markets	0.121**	0.040	0.166	0.400	0.154*	0.052	0.012	0.826
Television	0.128	0.198	0.055	0.628	0.202*	0.100	-0.147***	0.005
Radio	-0.166*	0.084	-0.150	0.217	-0.120	0.460	-0.030	0.549
Mobile Phone	-0.120	0.211	-0.114	0.731	-0.167	0.434	0.053	0.317



Objective 3 – Assess the barriers to the uptake of climate forecast/information for building resilience in agricultural systems in Ghana

Perceived barriers to the uptake of climate information	N	%
Inadequate information on seasonal forecast for long-term planning	449	80.9
Low accessibility of climate information (lack of TV, radios etc.)	434	78.2
High illiteracy levels	426	76.8
Lack of awareness of climate information	414	74.6
Timeliness of climate forecast/information	360	64.9
Lack of reliability of climate forecast/information	349	62.9
Not sure how to get this climate information	305	55.0
Misalignment between climate information provided and what is needed by farmers	300	54.1
The information is difficult to understand (technical language)	298	53.7
Not clear how this information can be used to help with farming	277	49.9

Table 7: Barriers constraining the uptake of climate information



Conclusion

- Climate change is a key threat to agricultural development in Anglophone West Africa.
- Climate Information Services (CIS) have not been incorporated into climate facing strategic national policy documents of Anglophone West Africa countries.
- Challenges impeding the incorporation of CIS into national policies and sectoral plans
 - *low awareness of climate change among policy makers,*
 - *low prioritisation of CIS,*
 - *human and institutional capacity constraints and,*
 - *low appreciation of the vulnerability status of various local assemblies.*
- More than a third of the respondents (40%; n = 555) were not receiving climate information.
- Access to and willingness to pay for climate information is greatly influenced by different socioeconomic characteristics with gender being key.



Conclusion

- Farmers use climate information for important decisions including land preparation and crop variety selection.
- The uptake of climate information is confronted with multiple barriers including
 - *inadequate information on seasonal forecast for long-term planning,*
 - *low accessibility of climate information,*
 - *difficulties in understanding technical language used in communicating climate information*
 - *misalignment between the climate information provided and what is needed by smallholder farmers.*



Journal articles published

- **Antwi-Agyei et al.**, (2021). Understanding climate services for enhancing resilient agricultural systems in Anglophone West Africa: The case of Ghana. **Climate Services**. 2, 100218
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<https://doi.org/10.1016/j.envdev.2020.100580>.
- **Antwi-Agyei, P.**, Nyantakyi-Frimpong, H. (2021). Evidence of Climate Change Coping and Adaptation Practices by Smallholder Farmers in Northern Ghana. **Sustainability** 2021, 13, 1308.
<https://doi.org/10.3390/su13031308>.
- **Antwi-Agyei et al.**, (2021). Opportunities and barriers for using climate information for building resilient agricultural systems in Sudan savannah agro-ecological zone of northeastern Ghana. **Climate Services**, 22, 100226.
<https://www.sciencedirect.com/science/article/pii/S2405880721000145>.
- **Antwi-Agyei, P.**; Stringer, L.C. (2021). Improving the effectiveness of agricultural extension services in supporting farmers to adapt to climate change: insights from northeastern Ghana. **Climate Risk Management**, 33, 100304, <https://www.sciencedirect.com/science/article/pii/S2212096321000334>.





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